R E P O R T R E S U M E S

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AN 8-WEEK SUMMER INSTITUTE TRAINING PROGRAM TO RETRAIN OFFICE EDUCATION TEACHERS FOR TEACHING BUSINESS ELECTRONIC DATA PROCESSING.

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AN INSTITUTE WAS CONDUCTED TO RETRAIN TEACHERS IN (1) THE TEACHING OF BUSINESS ELECTRONIC PROCESSING AND PROGRAMING AND (2) THE DEVELOPMENT OF COURSE MATERIAL. COURSES OF STUDY AND ENRICHMENT EXPERIENCES WERE INCLUDED IN THE 8-WEEK PROGRAM. TRAINING IN ELECTRONIC DATA PROCESSING WAS RECEIVED BY 35 TEACHERS. CLASS OUTLINES WERE ALSO DEVELOPED TO PROVIDE A FOUNDATION FOR PARTICIPANTS TO DEVELOP LOCAL PROGRAMS OF INSTRUCTION. RECOMMENDATIONS FOR CONTINUED STUDY OF BOTH A FORMAL AND INFORMAL NATURE WERE MADE. (RS)

ED003100

5-0031

AN EIGHT WEEK SUMMER INSTITUTE TRAINING PROGRAM TO RETRAIN OFFICE EDUCATION TEACHERS FOR TEACHING BUSINESS ELECTRONIC DATA PROCESSING

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PURPOSE

The complexity of modern civilization has produced electronic data processing as a necessary means of achieving answers to problems with speed and accuracy. In only a few years the use of electronic data processing has grown until the number of people who work in the industry has surpassed predictions. What's more, growth in the use of electronic data processing has only begun it seems, and the need for trained people will therefore multiply.

The impact of electronic data processing has been felt in both the instructional and administrative areas of the country's educational institutions down through the high schools as follows:

1. Instruction in both scientific and business electronic data processing has been initiated on all levels from the high schools to the universities.
2. The need for trained personnel in the growing electronic data processing industry has placed the burden of educating the needed people upon the school system.
3. Burgeoning school enrollments are forcing educational administrators to explore new methods for keeping up with the swelling student population and its attendant problems.

Responsibility for training data processing personnel falls upon the public school system. This responsibility is being met by methods ranging from a required EDP Survey Course to required programming courses. In between are elective courses in computer operation, since the need for such workers is also severe. One solution to the increasing problem is to begin data processing training in the high schools and to continue it through at least the junior college level, and where feasible, through the senior college institutions as well, to provide people who can investigate and establish totally integrated computer systems.

There is an acute shortage of teachers for business data processing using computers and peripheral equipment. Since regular teacher education programs have not been developed in this relatively new field of instruction, the Summer Institute program was instituted to meet the nationwide need for teachers. W. W. Holding Technical Institute is one of five schools which conducted such an institute in 1965; the others were Colorado State University, Fort Collins, Colorado; Miami-Dade Junior College, Miami, Florida; Milwaukee Institute of Technology, Milwaukee, Wisconsin; and Orange Coast College, Costa Mesa, California.

This institute has the following specific objectives:

1. To retrain teachers with a minimum of three years experience in business or office education for teaching of newly emerged business electronic data processing, including computer programming.
2. To further develop suggested course material--including course content, references, visual and other instructional aids--suitable for use as patterns and guidelines for future programs.

PROCEDURE

I. The institute consisted of both first and second year courses, and the content was designed specifically to meet the needs of participants in the following subject areas:

Introduction to Business Data Processing:
Theory and Applications
Electric Accounting Machines
Computer Programming I
Computer Programming II
Mathematical and Statistical Programming
Business Systems Design and Development
Advanced Programming Systems
Philosophy and Principles of Vocational Education

In addition to direct emphasis in the listed subject areas, enrichment sessions were held for all students in the form of field trips, guest lecturers, and seminars. College credit, on either the graduate or undergraduate level, was available to those desiring it.

Separate classes were conducted for first-year participants and for second-year participants. For both groups the instructional procedure involved:

Lecture
Lecture-Laboratory
Actual work on equipment
Observation of data processing procedures in business
Wiring programs
Writing programs
Committee work
Oral and written reports
Discussion sessions
Seminars

II. A brief description of the courses offered appears in the Appendix together with course outlines.

III. Schedule

Students attended classes for approximately eight hours per day for a total of 324 hours for the eight week period. Hours per course were scheduled as follows:

FIRST YEAR:	CLASSROOM	LAB
Introduction to Business Data Processing: Theory and Applications	40	30
Electric Accounting machines	70	50
Computer Programming I	80	30
Philosophy and Principles of Vocational Education	24	0
	214	110

324 hours

SECOND YEAR	LECTURE	LAB
Computer Programming II	40	50
Mathematical and Statistical Programming	40	30
Business Systems Design and Development	40	0
Advanced Programming Systems	40	60
Philosophy and Principles of Vocational Education	24	0
	184	140

324 hours

RESULTS AND CONCLUSIONS

The two basic objectives of the institute were achieved. Thirty-five teachers from twelve states received training in the field of electronic data processing, and most of these are now teaching in the field. Class outlines were developed during the eight weeks to provide a well-documented foundation for participants to build local data processing programs.

The eight week time period was not sufficient to provide adequate training for participants in all areas of EDP. Basic knowledge was covered, but we recommend continued study, both formal and informal. We feel a third year of institute-type study would be highly desirable, based both on institute faculty observations and comments of participants. Much can also be said in favor of periodic upgrading of the institutes for graduates of earlier summer institutes, since EDP technology is changing so rapidly.

APPENDIX

SCHEDULE FOR 1965 DATA PROCESSING SUMMER INSTITUTE

FIRST YEAR STUDENTS

Instructor	8:15am-10:00am	10:15am-12:00N	1:00pm-1:45pm	1:45pm-5:00pm	5:00pm-6:00pm
MAYER	Introduction to Business Data Processing: Theory and Applications	Computer Programming I	Computer Programming I		
NICELEY				Electric Accounting Machines	
HANSON					Principles and Philosophy of Industrial Education (M - W - Th)

Morning Break	10:00 am-10:15 am
Lunch	12:00N-1:00 pm
Afternoon Break	3:00 pm-3:15 pm
Computer Center Hours:	7:45 am to 11:00 pm Monday thru Friday Saturday by Appointment

SCHEDULE FOR 1965 DATA PROCESSING SUMMER INSTITUTE

SECOND YEAR STUDENTS

Instructor	8:00am-9:45am	9:45am-10:45am	11:00-12:00N	1:15pm-2:30pm	2:30pm-5:00pm	5:00pm-6:00pm
BLALOCK	Mathematical and Statistical Programming	Business Systems Design and Development				
DAVIS			Computer Programming II Lecture	Computer Programming II Laboratory		
BLALOCK & DAVIS					Advanced Programming Systems	
HANSON						Principles & Philosophy of Industrial Education (M - W -Th)

Morning Break 10:45 am-11:00 am

Lunch 12:00 N-1:15 pm

Afternoon Break - None scheduled

Computer Center Hours - 7:45 am-11:00 pm
Monday thru Friday
Saturday by appointment

COURSE DESCRIPTIONS

FIRST-YEAR PARTICIPANTS

1. Introduction to Business Data Processing: Theory and Applications

   Study of the development of computer systems from manual methods to stored programs. Designed to provide a foundation for detailed study of specific systems. Business data processing applications are also studied as a practical means of illustrating systems. Case studies and realistic exercises are used to illustrate hardware configurations and uses.

2. Electric Accounting Machines:

   A survey of electric accounting machines, illustrating the need for machines in accounting and record keeping and the concept, power, and flexibility of the unit record. The importance and scope of unit record equipment as an independent system will be developed throughout the course. Laboratory exercises will be executed involving planning and wiring a range of unit record equipment. Practical exercises offered will be typical of those performed in existing electric accounting machine installations.

3. Computer Programming I:

   Consideration of the function and capabilities of a specific data processing machine and the tools and raw materials necessary for becoming a programmer. Participants will perform programming drills, exercises, and case studies which will serve to bridge the gap from the theoretical to the real world of data processing.

SECOND-YEAR PARTICIPANTS

1. Computer Programming II:

   A continuation of Computer Programming 1. The principles presented in the first-year course will be employed repeatedly. Programming the tape data processing system will be taught as well as the fundamentals of random access programming.

2. Mathematical and Statistical Programming:

   An introduction to programming systems to familiarize the student with the purpose and function of the various types of systems. Mathematical and statistical problems are used as laboratory exercises to give facility in using programming systems.

3. Business Systems Design and Development:

   Designed to guide the student through the three stages in the evolution of a system: analysis of present information flow; needed information flow; system specifications and equipment selections and implementation of the system.

4. Advanced Programming Systems:

   Efforts will be made to provide the student with sufficient knowledge of programming systems concepts so that he may master any specific system with a minimum of instruction. Furthermore, he should be qualified to analyze, evaluate, and make minor modifications to such systems.

ALL PARTICIPANTS

1. Philosophy and Principles of Vocational Education:

   A presentation of the development of vocational education, the types of programs, philosophy, trends and problems in the field, and a study of provisions for offering and financing such programs.

INTRODUCTION TO BUSINESS DATA PROCESSING: THEORY AND APPLICATIONS

I. Introduction
   - A. Technological Changes
   - B. Growth of data processing
   - C. Future

II. Flowcharting techniques
   - A. Template
   - B. Basic symbols
     1. system
     2. program
   - C. Special symbols
   - D. Techniques and conventions
     1. identification
     2. cross-referencing
     3. striping
     4. decision
     5. description titles
   - E. Examples of flowcharts

III. Computer Data Representation
   - A. Binary code
   - B. Binary number system
   - C. Computer codes
     1. seven-bit alphameric
     2. two-out-of-five fixed count
     3. bi-quinary
     4. six-bit numeric
   - D. Data recording media
     1. cards
     2. paper tape
     3. magnetic tape
     4. magnetic ink

IV. Storage Devices
   - A. Core
   - B. Magnetic drums
   - C. Magnetic disk
   - D. Data Handling methods

V. Central Processing Unit (CPU)
   - A. Functional units
     1. register
     2. counter
     3. adder
   - B. Machine cycles
     1. instruction
     2. execution

C. Computer operation
   1. serial
   2. parallel
   3. fixed word length
   4. variable word length

VI. Input-Output Devices
   A. Input
      1. card reader
      2. magnetic tape
      3. paper tape reader
      4. printer (typewriter)
      5. consoles
      6. data buffering
   B. Output
      1. card punches
      2. magnetic tape
      3. paper tape punch
      4. printers
      5. cathode ray tube
      6. console
      7. data buffering

VII. Stored Program Concepts
   A. Instructions
      1. single address
      2. double address
   B. Developing a program
      1. flow charts
      2. block diagrams
   C. Reading Data
   D. Calculating
      1. addition
      2. subtraction
      3. multiplication
      4. division
      5. speed
   E. Logical operations
      1. consecutive
      2. branch
   F. Comparing
      1. equal
      2. unequal
   G. Modification
      1. instruction
      2. address
      3. indexing
      4. indirect addresses

VIII. Programming Systems
- A. Program preparation
  - 1. machine language
  - 2. programming language
  - 3. processer
    - a. autocoder
    - b. macro-instructions
- B. Programs
  - 1. compilers
    - a. fortran
    - b. cobol
  - 2. packages
  - 3. sort
  - 4. merge
  - 5. utility

IX. Procedure Control
- A. Control groups
  - 1. payroll data
  - 2. sales data
- B. Systems checks
  - 1. record sound
  - 2. control total
  - 3. proof figures
  - 4. limit check
  - 5. crossfooting checks
  - 6. tape label
  - 7. housekeeping
  - 8. check point and restart
- C. Machine checking
  - 1. validity
  - 2. parity

X. Form Design
- A. Initial considerations
  - 1. need for a form
  - 2. equipment to be used
  - 3. types of information to be recorded
  - 4. lay out the form
- B. Design considerations
  - 1. size
    - a. width
    - b. length
  - 2. spacing
    - a. horizontal
    - b. vertical
  - 3. skipping
  - 4. number of characters
    - a. numeric
    - b. alphabetic
    - c. amount field
    - d. check protection

5. alignment guide
6. marginal perforations
7. binding
8. carbon copies
9. types of forms
    a. stock
    b. custom

XI. Card Design
  A. Types of cards
    1. transcript
    2. dual
    3. mark-sensed
    4. output
    5. special
      a. short
      b. port-a-punch
      c. tumble and sectional
  B. Initial considerations
    1. card data
    2. field size
    3. data sequence
      a. location in other cards
      b. on the source document
      c. equipment to be used
      d. manual operations
  C. Design considerations
    1. layout forms
    2. drawing the layout
    3. testing the card design

ELECTRIC ACCOUNTING MACHINES

I. Introduction
   - A. Card and card code
     1. numeric
     2. alphabetic
     3. special character
   - B. Card layout
   - C. Card reading
   - D. Wires
     1. temporary
     2. permanent
     3. self-contacting
     4. jackplugs
     5. color coding
   - E. Control panels
     1. permanent contacts
     2. non-permanent

II. 24 and 26 Card Punch
   - A. Operating features
     1. program card
     2. program drum
   - B. Operations
     1. manual
     2. program control
     3. numeric and alphabetic punching
     4. error correction
   - C. Printing features
     1. left zero print
     2. print suppression
   - D. Optional features
     1. alternate programming device
     2. decimal tabulation device
     3. program-card preparation device
     4. variable-length card feed device
   - E. 56 Verifier
     1. operating features
     2. operation
     3. method of verification

III. 82 Sorter
   - A. Operating features
     1. main line switch
     2. feed hopper
     3. sorting brush
     4. selection switches
     5. start and stop keys
     6. pockets

B. Types of operation (sorting)
   1. numeric
   2. alphabetic
   3. block
   4. needle
C. Special devices
   1. auxiliary card counter
   2. card matching
   3. group sorting
   4. sorting suppression
   5. multiple column selection
D. Comparison of sorters
   1. 75 - 80 - 82 - 83 - 84
   2. speed
   3. flexibility

IV. 548 Interpreter
A. Operating features
   1. main line switch
   2. card feed
   3. card stacker
   4. print-position knob
   5. start and stop keys
B. Types of operation
   1. printing
   2. selection
   3. zero printing
   4. zero elimination
   5. x-elimination
C. Comparison of interpreters
   1. 548 - 552 - 557
   2. speed
   3. flexibility

V. 514 Reproducing Punch
A. Operating features
   1. main line switch
   2. feed units (read and punch)
   3. card stackers
   4. control panel and switches
   5. start and stop keys (also signal lights)
   6. comparing indicator unit
   7. summary punch cable
B. Operation
   1. punching unit
   2. rading unit
   3. combined operation
   4. comparing magnets

C. Types of operation
   1. reproducing
      a. straight
      b. field selected
      c. selective
      d. combined with gangpunching
      e. x-elimination or transfer
   2. gangpunching and verifying
      a. one master card
      b. interspersed master cards
      c. offset
   3. summary punching
   4. mark sensing
   5. card comparing

D. Special Devices
   1. gangpunch omitter
   2. double-punch and blank-column detection
   3. offset stacker
   4. consecutive-number gangpunching and checking

VI. 85 Collator

A. Operating features
   1. main line switch
   2. keys (start, stop, run-out, and reset)
   3. lights (error, ready, BCD1, and BCD2)
   4. hoppers
   5. pockets
   6. reading brushes

B. Operating principles
   1. Sequence
   2. schematic diagram of feeds
      a. primary
      b. secondary
   3. analysis chart for feeding
   4. run-in feeding

C. Types of operations
   1. merging
   2. matching
   3. sequence checking
   4. selecting

D. Comparisons of collators
   1. 77 - 85 - 87 - 88
   2. speed
   3. flexibility

VII. 402 Accounting Machine

A. Operating features
   1. main line switch
   2. keys (start, stop, and final total)
   3. lights (unlabeled, stop, fuse, form, and card feed stop)
   4. printing unit
   5. control panel

B. Operation
   1. detail printing
      a. numerical information
      b. alphabetic information
   2. group printing
   3. summary punching
C. Types of operations
   1. zero printing
   2. addition
   3. comparing
   4. subtraction
   5. selection
      a. digit
      b. printing
      c. field
      d. class
      e. multiple x
   6. group indication
   7. setup change switches
   8. total transfer
   9. crossfooting
   10. space control
D. Tape-controlled carriage
   1. control tape
   2. operating features
   3. form control

COMPUTER PROGRAMMING I

I. Introduction
   - A. What is a computer
   - B. What do computers do
   - C. Stored program concept

II. Physical Features
   - A. Solid-state circuitry
   - B. Typewriter
     1. input
     2. output
     3. parity checking
   - C. 961 tape punch
     1. speed
     2. loading
   - D. 1621 paper tape reader
     1. loading
        a. strip
        b. center roll
        c. reel
     2. operating switches and lights
   - E. 1622 card read-punch unit
     1. card read
     2. card punch
     3. indicators
     4. operator keys and lights
   - F. 1623 core storage unit
     1. capacity
     2. checking

III. Operating Features
   - A. Indicators
     1. parity check
     2. input-output
     3. overflow
   - B. Switches
     1. program
     2. power
     3. emergency off
   - C. Lights
     1. power on
     2. automatic and manual
     3. insert
     4. save
     5. check stop
     6. reader no feed
     7. punch no feed
     8. thermal

D. Keys
   1. start
   2. reset
   3. insert
   4. save
   5. release
   6. stop
   7. instant stop
   8. display MAR

IV. Data Representation
   A. Digits
      1. BCD bit array
      2. check bit
      3. flag bit
      4. record mark
      5. numerical blank
   B. Field
   C. Record
   D. Mode
      1. numeric
      2. alphabetic

V. Storage
   A. Magnetic core
      1. capacity
      2. speed
   B. Core array
   C. Two-character transfer
   D. Address cycle

VI. Instruction Characteristics
   A. Format
      1. operation code
      2. P address
      3. Q address
   B. Operation Cycles
      1. instruction
      2. execution
   C. Arithmetic
      1. add
      2. subtract
      3. multiply
      4. divide
   D. Internal data transmission
      1. transmit digit
      2. transmit field
      3. transmit record
   E. Compare

F. Branch
    1. unconditional
        a. branch
        b. branch and transmit
        c. branch back
    2. conditional
        a. branch on digit
        b. branch no flag
        c. branch no record mark
        d. branch indicator
        e. branch no indicator

VII. Input-Output Operations
A. Typewriter
    1. control
    2. read
        a. numeric
        b. alphanumeric
B. Tape punch
C. Paper tape reader
D. Card punch
E. Card reader

VIII. Flow Charting
A. Template
B. Basic program symbols
C. Special symbols
D. Flowcharting techniques
E. Sample flowcharts

IX. Indexing
A. Address modification without indexing feature
    1. advantages
    2. disavantages
    3. methods
B. Address modification with indexing feature
    1. increasing an address
    2. decreasing an address
    3. advantages
    4. disadvantages

X. Subroutines
A. Types of subroutines
    1. open
    2. closed
B. Entry and exit
C. Libraries
D. Macro-instruction

XI. Symbolic Programming System
    A. Coding sheet
        1. page number
        2. line number
        3. label
        4. operation
        5. operands and remarks
            a. actual
            b. symbolic
            c. immediate
            d. asterisk
    B. Processor
        1. pass 1
        2. pass 2
    C. Area definitions
        1. define symbol
        2. define constant
        3. define symbolic address
        4. define symbolic block
    D. Symbolic programming instructions
        1. label
        2. operation code
        3. operands and remarks
        4. macro-instructions
    E. Processor control operations
        1. define origin
        2. define end
        3. comments

COMPUTER PROGRAMMING II

I. Computer History

Survey of computers; compilers; and languages.

II. IBM 1620 FORTRAN

FORTRAN overview; FORTRAN compiler; FORTRAN subroutines.

III. FORTRAN statement Construction

Arithmetic; fixed point; floating point; and rules governing construction of FORTRAN statements.

IV. Input-Output

I-O devices; lists; formats; read; punch; type; and accept.

V. Program Control

Go to; computed go to; if; do loops; continue; pause; stop; and; sense switch; nested do loops; and arithmetic checks.

VI. Program Specifications

Dimension; common; and equivalence.

VII. Disk Associated Statements

Find; define; record and fetch.

VIII. Subroutines and Functions

Library; definition; return; and rules of construction.

IX. SPS Overview

X. Storage and Instruction Format

XI. Arithmetic Instructions

XII. Immediate Version of Arithmetic Instructions.

XIII. Setting Flags in Instructions

XIV. Input-Output Instructions

Read; write; numerically; alphanumerically; punch; reader; and typewriter.

XV. Indirect addressing

XVI. Control or Conditional Statements

Branch; branch on indicators; loops; etc.

XVII. Subroutines

XVIII. Floating Point Subroutines

Monitor Programming

XIX. Supervisory Programs

XX. Control Cards

XXI. FORTRAN II-D

Differences between FORTRAN II-D and FORTRAN with Format

XXII. SPS II-D

Differences between SPS-11 and SPS 11D

XXIII. Disk Utility Programs

XXIV. Link Facility

MATHEMATICAL AND STATISTICAL PROGRAMMING

I. Frequency Distributions
   - A. Raw Data
   - B. Discrete and Continuous Series
   - C. Statistical Analysis of Simple Data
     1. The array
     2. Tally sheets
     3. Class intervals
     4. Class limits
     5. Graphs
     6. Types

II. Measures of Central Tendency and Variation
   - A. Averages
   - B. Arithmetic mean
     1. Simple summation
     2. Long method with class intervals
     3. Arithmetic mean by short method
     4. Weighted arithmetic mean
     5. Averaging a series of means
     6. Geometric mean
     7. Harmonic mean
     8. Mode

III. Distributions: Symmetry, Skewness, and Peakedness
   - A. Range
   - B. Quartile Deviation
   - C. Mean Deviation
   - D. Standard Deviation
   - E. Quadratic Mean
   - F. Moments around Arithmetic and Arbitrary Means
   - G. Measure and Computation of Skewness
   - H. Coefficient of Variation

IV. Permutation, Combination, and Probability
   - A. Permutation
     1. Definition
     2. The multiplication principle
     3. The addition principle
     4. Formulas
   - B. Combinations
     1. Definition
     2. Comparison with permutations
     3. Formulas and theorems
   - C. Probability
     1. Definition
     2. Counting formulas
     3. Composite events
     4. Addition

5. Multiplication
6. Empirical probability
7. Probability distributions
   a. Binomial distribution
   b. Normal distribution

V. Estimation of Population Means and Proportions from Samples
   A. Mean and Median as Measures of Average
   B. Measures of Variability
   C. Normal Distribution
   D. Characteristics of the Sampling Distribution of Sample Mean
   E. Characteristics of the Sampling Distribution of Sample Variance
   F. One-sided and Two-sided tests

VI. Analysis of Variance
   A. Testing the Hypothesis of Equal Means
   B. Sum of Squares Identity
   C. Analysis of Variance Table
   D. The F Test
   E. Contrasts and the Method of Scheffe
   F. Testing for the Equality of Variances
   G. Drawing Inferences

VII. Regression and Correlation
   A. The Regression Problem
   B. Binomial Normal Distribution
   C. Inference in Regression Analysis
   D. Inference in Correlation Analysis
   E. Drawing Inferences

VIII. Linear Programming
   A. The Graphical Method
   B. Matrices and Vectors
   C. The Vector Method
   D. The Simplex Method
   E. Transportation Model
   F. Critical Path Method
      1. Concept
      2. Planning and Diagramming
      3. Calculations
      4. Revisions

BUSINESS SYSTEMS DESIGN AND DEVELOPMENT

I. The Systems Staff and Its Relation to Management
   - A. Management
     1. Definition and Functions
     2. Functions
   - B. Systems
     1. Evalution of Systems
     2. Systems Department
     3. Types of Systems Staffs
     4. Elements of Organization in Systems Analysis
     5. Organization Design

II. Systems Functions, Concepts, and Programs
   - A. Need for Systems Staff
   - B. Systems Functions
     1. Organization Planning and Analysis
     2. Systems Analysis and Design
     3. Management Audit
     4. Policies, Procedures
     5. Forms Design and Control
     6. Reports Analysis and Control
     7. Records Management
     8. Work Measurement
     9. Office Equipment Selection
     10. Office Layout
     11. Systems Implementation
   - C. Systems Concepts
     1. Types of Approaches
     2. Gains from Electronic Data Processing
     3. Total Systems
   - D. Systems Programs
     1. Objectives and Policies
     2. Obstacles

III. Procedures for Making a Systems Survey
   - A. Reasons for a Business System
   - B. Survey Initiation
   - C. Planning the Study
   - D. Beginning the Study
   - E. Fact Gathering
   - F. Recording of Data
   - G. Conducting the Study
     1. Data to be gathered
     2. Duties of Personnel
     3. Policies
     4. Details of Existing Systems
     5. Analysis of Data
   - H. Human Relations

IV. Preparation of Charts for Graphical Representation
- A. Charting Symbols
- B. Types of Charts and Their Uses
  1. Flow Process Chart
  2. Horizontal Flow Chart
  3. Vertical Flow Chart
  4. Combination Horizontal-Vertical Flow Chart
  5. Schematic Flow Chart
  6. Mechanized Data Processing Charts
  7. Form Charts
  8. Man and Machine Charts
  9. Scheduling and Progress Chart
  10. Work Distribution Chart
  11. Organization Chart

V. Office Layout and its Relation to Systems Analysis
- A. Layout Facts
- B. Layout Analysis
- C. Space Requirements
- D. Office Standards Program
- E. Office Environment

VI. An Overall View of Systems Analysis
- A. Attitude
- B. Approach
- C. Mechanics
- D. Organization of Data
- E. Check list

VII. Salesmanship in Systems Work
- A. The need for Salesmanship
- B. Selling the Idea
- C. Presentation of Proposals
  1. Be sure of yourself
  2. Talk to people who can make decisions
  3. Make changes where necessary
  4. Obtain assistance as needed
  5. Plan the presentation

VIII. The Installation and Follow-up of Systems
- A. Step-by-step Installation Plan
- B. Type of Installation
- C. Installation Controls
- D. Time Schedule
- E. Personnel
- F. Forms
- G. Manuals
- H. Publication
- I. Training
- J. Follow-up
- K. Systems Responsibility

IX. Forms Analysis
- A. Objectives
- B. Specifications
- C. Paper Requirements

X. Administrative Work Measurement in Systems Analysis
- A. Definition of Work Measurement
- B. Main Value of Work Measurement
- C. Objectives of Work Measurement
- D. Work Standards
- E. Purposes of Work Measurement
- F. Planning the Program
- G. Selecting the Work to be Studied
- H. Methods of Measurement

XI. Forms Administration Programs
- A. Scope
- B. Design
- C. Reproduction and Procurement
- D. Inventory
- E. Control
- F. Forms Files
- G. File Uses

XII. Records Management Programs
- A. Function
- B. Records Retention
  1. Time retained
  2. Methods of retention
  3. Inventory

XIII. Office Tools Available for Systems Work
- A. Main Categories
  1. Information preparation
  2. Information communication
  3. Information handling and storage
- B. Information Preparation
  1. Peg boards
  2. Adding machines
  3. Calculators
  4. Typewriters
- C. Information Communication
  1. Duplicating machines
  2. Copying machines
  3. Dictating and transcribing equipment
  4. Intercom equipment
  5. Data transmission equipment
- D. Information Handling and Storage
  1. Punched cards
  2. Forms
  3. Keysort records
  4. Collating and sorting equipment
  5. Folding and mailing equipment
  6. Filing equipment

XIV. The Place of Keyboard Accounting Machines in Systems Work
- A. Types of Machines
- B. Functions
  1. Recording information
  2. Writing and Collating
  3. Classifying and summarizing
  4. Computing
  5. Certification and protection
- C. Forms
- D. Successful Installation Aids

XV. Peripheral Devices in Systems Work
- A. Definition
- B. Types of Media
  1. Punched cards
  2. Paper Tape
  3. Edge punched cards
- C. Equipment
  1. Recording data at source
  2. By-product preparation
  3. Machine language
  4. Converters
  5. Media Handling

XVI. Steps in EDP Feasibility Plan: Summary
- A. Steps
  1. Prepare study plan
  2. Analyze present system and cost
  3. Develop new general system and specifications
  4. Select new equipment and software
  5. Calculate expected installation costs
  6. Compare present and expected costs
  7. Present findings and recommendations to management

PHILOSOPHY AND PRINCIPLES OF VOCATIONAL EDUCATION

I. Introduction
   1. The need for education for work
   2. Definitions and vocabulary

II. The relationship between man, education, and work
   1. The problem
   2. New technologies
   3. Relationships
      a. Man and work
      b. Work and education
      c. Man and education

III. Brief history
   1. Practical arts education
   2. Vocational education
   3. Technical education

IV. Vocational and technical education
   1. Secondary level
   2. Post-secordary level

V. Federal legislation aiding vocational education
   1. Review of previous legislation
   2. Review of current legislation
   3. Administration of federally aided programs
   4. State plans

VI. Types of competencies needed in vocational teaching

1. General understandings
2. Personal qualities
3. Methods
4. Techniques
5. Work experience
6. Teaching experience
7. Personal self-study and improvement

LIST OF AVAILABLE DATA PROCESSING EQUIPMENT

1	IBM 082 Sorter
4	IBM 024 Card Punch
2	IBM 026 Printing Card Punch
1	IBM 056 Verifier
1	IBM 514 Reproducing Punch
1	IBM 085 Collator
1	IBM 402 Accounting Machine
2 ea.	IBM 1620 Data Processing System-Central Processor 1622 Card Reader-Punch 1632 Card Reader-Punch Adapter 1021 Additional Instructions 1205 Automatic Divide 4650 Indirect Addressing
26	IBM 085 Wiring Panels
26	IBM 514 Wiring Panels
27	IBM 402 Wiring Panels
20	Wiring Stand
55	Wire Complement

NOTE: The following equipment was delivered in October, 1965:

IBM 3339 Disk Storage Drive Adapter

IBM 1311 Disk Drive

IBM 1316 Disk Pack (2)

The computer center operated on a full open-shop basis.

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